

1   **WHAT IS CLAIMED IS:**

2           1. An over-voltage protection coil control circuit comprising:  
3           a power supply;  
4           a Hall sensor (10) adapted to connect to coils to detect polarity changes on  
5 the coils;  
6           a pulse generator (12) connecting to the Hall sensor (10) and having two  
7 output terminals;  
8           two driver circuit (13,14), wherein each driver circuit (13,14) is a transistor  
9 connecting to each corresponding output terminal of the pulse generator (12) and  
10 each corresponding coil;  
11          an over-voltage protection circuit (20) containing a Zener diode having a  
12 positive pole and a negative pole, wherein the positive pole of the Zener diode is  
13 connected to the power supply, and the negative pole of the Zener diode is connected  
14 to the transistors in each driver circuit (13,14);  
15          wherein the coils produce a high inverse emf due to the polarity inversion  
16 when the transistors change from ON to OFF, and the Zener diode is conducted to  
17 guide the high inverse emf to the power supply.

18          2.The control circuit as claimed in claim 1, wherein the negative pole of the  
19 Zener diode is further connected to negative poles of two diodes, and positive poles  
20 of the two diodes are respectively connected to the transistors in the each driver  
21 circuit (13,14).

22          3.The control circuit as claimed in claim 2, wherein each transistor in each  
23 driver circuit (13,14) is an FET transistor, and gates of the FET transistors are  
24 respectively connected to the two output terminals of the pulse generator (12), drains

1 of the FET transistors are respectively connected to corresponding coils and each  
2 positive pole of each diode.

3 4. The control circuit as claimed in claim 2, wherein each transistor in each  
4 driver circuit (13,14) is a BJT transistor, and bases of the BJT transistors are  
5 respectively connected to the two output terminals of the pulse generator (12),  
6 collectors of the BJT transistors are respectively connected to corresponding coils  
7 and each positive pole of each diode.

8 5. The control circuit as claimed in claim 3, wherein an amplifier (11) is  
9 further connected between the Hall sensor (10) and the pulse generator (12).

10 6. The control circuit as claimed in claim 4, wherein an amplifier (11) is  
11 further connected between the Hall sensor (10) and the pulse generator (12).